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ABSTRACT

The development and implementation of a high-tech laboratory in a small suburban high school in Pequannock Township, New Jersey, demonstrates that the high-tech future is both possible and valuable as it permeates the entire curriculum. In 1984, the vocational studies department shifted its emphasis to prepare students for college as well as for the job market, and changed the department's title to the Technological Studies Department. In addition to changing course materials to focus on technology, a high-technology laboratory was created which utilizes a satellite communications dish that receives signals from 19 satellites in space. The high-technology wing of the school also includes an electronics lab, video-technology lab and studio, computer repair area, a drafting center, and a micro-computer center. Students in other disciplines also made use of the facilities in the high-technology laboratory to conduct experiments with alternate energy systems, robotics, communications through satellites, fiber-optics, and lasers. All of this future-oriented technology was studied by students in 1985-86 across curriculum areas such as physics, social studies, foreign languages, and mathematics. The key to this successful program resulted from a knowledgeable, committed, and talented staff; the efforts of in-house experts; and the enlistment and support of the Board of Education. The approach used to gain funding resulted in collaborative planning with other school districts, and a $50,000 grant was received from the state. (DJR)

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FEBRUARY 1986

HIGH TECHNOLOGY IN THE HIGH SCHOOL AND ITS EFFECT ON CURRICULUM
NASSP CONVENTION - ORLANDO

THIS AFTERNOON'S PRESENTATION IS GOING TO BE A LITTLE DIFFERENT FROM THOSE YOU MAY HAVE BEEN EXPOSED TO PREVIOUSLY. I WOULD ASK YOU TO MENTALLY CONCEPTUALIZE WHAT YOU ENVISION EDUCATION TO BE IN THE 1990's AND THE YEAR 2000 AND WHAT THE NEEDS OF TODAY'S STUDENTS ARE SO THEY CAN BE VIABLE CONTRIBUTING MEMBERS OF OUR SOCIETY AND DEVELOP AN APPETITE FOR THE NECESSARY TRAINING IN AREAS TO GAIN JOB ENTRY SKILLS.

I WOULD LIKE NOW TO PRESENT A SHORT SLIDE PRESENTATION THAT I HOPE WILL WHET YOUR APPETITE AND STIMULATE YOUR THINKING ABOUT HOW YOU TOO, WILL BE ABLE TO POSSIBLY ADAPT WHAT YOU'VE SEEN AND HEARD TODAY TO YOUR RESPECTIVE SCHOOL PROGRAMS.

MERGE A SATELLITE DISH ANTENNA WITH A COMPUTERIZED ASSISTED DRAFTING LAB, EXPERIMENTS WITH ALTERNATE ENERGY SYSTEMS, ROBOTICS, COMMUNICATIONS THROUGH SATELLITES, FIBER-OPTICS AND LASERS -- ALL FUTURE ORIENTED TECHNOLOGY -- AND ALL STUDIED BY OUR STUDENTS IN 1985-86, AND YOU HAVE THE COMPONENTS FOR THE HIGH-TECHNOLOGY THRUST AT PEQUANNOCK TOWNSHIP HIGH SCHOOL.

WHILE N.A.S.S.P. ADVISES PRINCIPALS TO PLAN FOR THE UP-TO-DATE USES OF TECHNOLOGY IN FUTURE HIGH SCHOOLS, (IN THE NOVEMBER 1985, NASSP BULLETIN) THE DEVELOPMENT AND IMPLEMENTATION OF OUR HIGH-TECH LABORATORIES DEMONSTRATES

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THAT THE HIGH-TECH FUTURE IS ALREADY BOTH POSSIBLE AND EXTREMELY VALUABLE AS IT PERMEATES THE ENTIRE CURRICULUM.

IN 1984-85, THE VOCATIONAL STUDIES DEPARTMENT OF OUR SMALL (950) SUBURBAN HIGH SCHOOL REVIEWED ITS INDUSTRIAL ARTS CURRICULUM. WITH THE AID OF DR. RONALD TODD OF NEW YORK UNIVERSITY, DEPARTMENT MEMBERS AND THE HIGH SCHOOL ADMINISTRATION, PLANS WERE FORMULATED FOR THE TRANSFORMATION OF ITS PRE-VOCATIONBAL COURSES TO PREPARE STUDENTS NOT ONLY FOR THE JOB MARKETS OF THE PRESENT DAY AND FUTURE BUT FOR COLLEGE AS WELL. (THIS CHANGE IS A PREDICTION STATED BY DECKER & KRAYEWSKI IN THEIR ARTICLE AGAIN FOUND IN THE NOVEMBER N.A.S.S.P BULLETIN). THIS SHIFT IN EMPHASIS WAS REFLECTED IN THE CHANGE OF THE DEPARTMENT'S TITLE TO THE TECHNOLOGICAL STUDIES DEPT.

COURSES HAVE BEEN RE-WRITTEN AND THE COURSE TITLES HAVE BEEN CHANGED TO STRESS THEIR FOCUS ON TECHNOLOGY THE COURSES ARE NOW TITLED ARCHI-TECTURAL DRAFTING, AUDIO VISUAL TECHNOLOGY, BASIC INDUSTRIAL TECHNOLOGY, COMPUTER ASSISTED DRAFTING, DIGITAL ELECTRONICS, DRAFTING TECHNOLOGY, ENERGY & TRANSPORATATION, PRODUCT DEVELOPMENT AND WOOD DESIGN.

ONE OF THE EMERGING HIGHLIGHTS OF OUR HIGH-TECHNOLOGY PROGRAM IS A NEW COURSE ENTITLED "PRINCIPLES OF TECHNOLOGY," WHICH WILL BE FULLY INTEGRATED INTO THE CURRICULUM IN THE FALL OF 1986. THIS COURSE IS DESIGNED TO

PROVIDE STUDENTS WITH A PRACTICAL "HANDS-ON" TYPE OF EXPERIENCE IN MODERN HIGH-TECHNOLOGY. AREAS DEALING WITH MODERN POWER CONVERSION, ALTERNATE ENERGY SYSTEMS, MODERN MANUFACTURING, TRANSPORTATION, SATELLITE COMMUNICATIONS, VIDEO-TECHNOLOGY, ROBOTICS, AND LASER ELECTRONICS DEVICES WILL BE TAUGHT.

CENTRAL TO THE REVISION OF THE OLD INDUSTRIAL ARTS CURRICULUM TO THE NEWLY CONCEIVED TECHNOLOGICAL STUDIES PROGRAM WAS THE CREATION OF A HIGH-TECHNOLOGY LAB. ONE WING OF OUR HIGH SCHOOL HAS BEEN DESIGNATED FOR THIS PURPOSE, WITH ANCILLARY STRUCTURES BOTH OUTSIDE AND ABOVE THE CLASSROOMS. IN AN EXTERIOR COURTYARD ADJACENT TO THE LAB, STUDENTS OF THE INDUSTRIAL TECHNOLOGY CLASSES HAVE BEGUN CONSTRUCTION OF AN ALTERNATE ENERGY STATION. HERE THE STUDENTS WILL BUILD, TEST AND MONITOR THE HEAT PRODUCTION THROUGH THE COMPUTER AND METERS ATTACHED TO THREE LIQUID CONTAINERS INSIDE THE LAB. SINCE THESE PROJECTS WILL NOT BE PERMANENT, ALTERATIONS TO THE SOLAR PANELS AND WINDMILLS CAN BE MADE TO FACILITATE THE PARTICULAR NEEDS OF EACH CLASS LESSON. ABOVE THIS WING RISES A SATELLITE COMMUNICATIONS DISH, RECEIVING SIGNALS FROM A WIDE RANGE OF SOURCES (19 SATELLITES IN SPACE). STUDENTS ENROLLED IN VIDEO-TECHNOLOGY HAVE BEGUN LEARNING ABOUT THE CAPABILITIES AND PROCESSES OF THIS SYSTEM. HOUSED IN THE HIGH-TECHNOLOGY WING

IS A SERIES OF INTERCONNECTED SPACES CONSISTING OF THE ELECTRONICS LAB, VIDEO-TECHNOLOGY LAB AND STUDIO, COMPUTER REPAIR AREA, A DRAFTING CENTER, AND A MICRO-COMPUTER CENTER FOR USE INALL OF THE SPECIFIC COURSES AND FOR OTHER DISCIPLINES AS WELL IN THE HIGH SCHOOL. STUDENTS IN DRAFTING TECHNOLOGY AND ARCHITECTURAL DESIGN UTILIZE THE COMPUTERS IN COMPUTER ASSISTED DRAFTING. OTHER STUDENTS IN PRODUCT DEVELOPMENT UTILIZE COMPUTERS TO DEVELOP DRAWINGS TO SCALE OF PROJECTS TO BE CONSTRUCTED FROM WOOD AND FOR METAL WHILE THOSE IN THE NEWLY CREATED PRINCIPLES OF TECH-NOLOGY COURSE WILL MAKE USE OF ALL ASPECTS OF THE LAB. THE COMPUTER REPAIR COURSE IS A VALUABLE ASPECT OF THE PROGRAM BECAUSE IT ENABLES US TO SHARPLY DECREASE THE "DOWN TIME" OF THE COMPUTERS AND STILL PROVIDE A STUDENT WITH THE PROBLEM-SOLVING SITUATION IN REPAIRING THE DEFECTIVE COMPONENT. (THIS ALSO LEADS TO ANOTHER INTERESTING SITUATION WHICH I WILL ADDRESS LATER).

THE NEW LAB IS EXCITING FOR STAFF, STUDENTS, AND THE COMMUNITY, WHO ARE CURRENTLY EXPOSED TO ITS PROGRAMS, BUT IT HOLDS A RICH POTENTIAL FOR THE ENTIRE CURRICULUM. ALREADY OUR PHYSICS STUDENTS HAVE BEEN TRACKING HALLEY'S COMET, WHILE OUR SATELLITE DISH HAS PROVIDED STIMULATING LESSONS AND INSIGHTS

TO BOTH SOCIAL STUDIES CLASSES VIEWING PARLIAMENTARY DEBATES, FOREIGN LANGUAGE CLASSES IN FRENCH, GERMAN, AND SPANISH AND VIEWED PROGRAMS IN THOSE RESPECTIVE LANGUAGES FROM CLASSROOMS ABROAD. MATHEMATICS AND PHYSICS STUDENTS HAVE BEEN CHARGED WITH DEVELOPING AND CONFIGURING THE SOLAR PANELS FOR THE ALTERNATE ENERGY STRUCTURE. RECENTLY ON THE VANGUARD SPACE SHUTTLE A GERMAN ASTRONAUT WAS SPEAKING TO NASA AND HIS FELLOW COUNTRYMEN IN HIS NATIVE TONGUE. OUR STUDENTS HAD THE OPPORTUNITY TO LISTEN TO THESE REMARKS IN GERMAN AND VALUABLE LESSONS EVOLVED FROM THESE COMMUNICATIONS.

THE KEY TO A SUCCESSFUL PROGRAM OR ANY OTHER HIGH SCHOOL PROGRAM IS THE SPONSORSHIP, LEADERSHIP, AND CREATIVE ABILITY OF YOU, THE PRINCIPALS. YOU HAVE TO BE AN ENTHUSIASTIC AND VISIONARY SPOKESMAN FOR YOUR FUTURISTIC PROGRAMS. INVOLVE YOUR STAFF, MEMBERS OF THE COMMUNITY, BOARD OF EDUCATION MEMBERS, AND CENTRAL ADMINISTRATION. MOST OF US HAVE SOME TYPE OF COMPUTER PROGRAMS IN OUR HIGH SCHOOLS. WE MUST EXPAND THOSE PROGRAMS TO FACILITATE ALL OUR PROGRAMS. THE PRINCIPALS MUST BE MORE THAN ABSTRACTLY COMMITTED; HE OR SHE HAS TO DEMONSTRATE INVOLVEMENT, SOME DEGREE OF KNOWLEDGE, AND REAL COMMIT MENT TO MOVING INTO TECHNOLOGICAL EDUCATION IN ORDER TO GAIN STAFF AND COMMUNITY SUPPORT.

SUPERVISORS CAN ALSO LEAD STAFFS TO REALIZE TECHNOLOGICAL ADVANTAGES, BUT ONLY IF THEY ARE INVOLVED THEMSELVES AND FOCUS THEIR DEPARTMENT'S ATTENTION ON TECHNOLOGY.

TALENTS OF STAFF MEMBERS AND OTHER LOCAL RESOURCES CAN PROVIDE TECHNOLOGICAL EXPERTISE NEEDED FOR SUCH AN EMPHASIS. THE SUCCESS OF OUR PLANNING PHASE RESULTED FROM COLLABORATION BETWEEN A KNOWLEDGEABLE COMMITMENT AND A TALENTED STAFF. MAKING USE OF IN-HOUSE EXPERTISE AND GIVING ENTHUSIASTIC SUPPORT TO THEIR EFFORTS WAS CRUCIAL TO GAINING APPROVAL OF THE PROGRAM, WITH THE CAPITAL AND EQUIPMENT EXPENSES INVOLVED. ENLISTING AND GAINING SUPPORT OF OUR BOARD OF EDUCATION WAS ANOTHER IMPORTANT FACTOR. AFTER MANY MULTI-FACETED PRESENTATIONS, THE BOARD OF EDUCATION READILY AGREED.

THE COMMITMENT AND CREATIVITY DEMANDED OF INSTRUCTIONAL LEADERS IN DEVELOPING AND IMPLEMENTING INTER-DISCIPLINARY USE OF THE HIGH -TECH LAB EXTENDS TO FRESH COLLABORATIVE THINKIKNG AMONG SCHOOLS AND BETWEEN EDUCATIONAL LEVELS. OUR APPROACH TO GAINING FUNDING FOR OUR LAB LED TO DISCUSSIONS WITH NEIGHBORING SCHOOLS AND OUR COUNTY VO-TECH SCHOOL. AS A RESULT, A COOPERATIVE CONSORTIUM ON PLANNING AND ARTICULATING HIGH-TECH PROGRAMS HAS EVOLVED WITH OUR VO-TECH SCHOOL AND NEIGHBORING REGIONAL

HIGH SCHOOL DISTRICT. A FURTHER EXTENSION OF SUCH CREATIVE COLLABORATIVE PLANNING MIGHT INVOLVE OUR COUNTY COLLEGE, SO THAT OUR PROGRAMS WOULD FEED INTO THEIR TECHNOLOGICAL COURSES.

THE NEW JERSEY STATE DIVISION OF VOCATIONAL EDUCATION TOOK A SPECIAL INTEREST IN THE HIGH-TECH PROPOSAL WE DEVELOPED AND ACCEPTED THE PROPOSAL AS A FUTURISTIC PROGRAM WHICH WILL MEET THE NEEDS OF STUDENTS. TO THIS END, THE STATE AWARDED OUR DISTRICT A $50,000 GRANT TO SUPPORT THE HIGH-TECH PROGRAM.

I BELIEVE WE HAVE AN OBLIGATION TO COMING GENERATIONS TO MAKE THE BEST POSSIBLE SCHOOL PROGRAMS AVAILABLE TO THEM AND TO HELP ALL STUDENTS FROM ALL BACKGROUNDS PREPARE FOR THE FUTURE. I BELIEVE THAT THE STRATEGIES AND POLICIES SET FORTH IN THIS PRESENTATION TODAY WILL GO FAR TOWARD FULFILLING THAT OBLIGATION; BUT PRECISELY BECAUSE IMPROVING EDUCATION IS A LONG TERM PROCESS, IT IS CRITICALLY IMPORTANT THAT WE LAY THE TECHNOLOGICAL FOUNDATION NOW. URGENT EFFORTS ARE NEEDED TO INCREASE EMPLOYABILITY, DEVELOP EDUCATION INVESTMENT STRATEGIES THAT HAVE HIGH PAY-OFFS, RE-VITALIZE THE TEACHING PROFESSION AND ESTABLISH STRONG, ENDURING PARTNERSHIPS BETWEEN BUSINESS AND THE PUBLIC SCHOOLS.